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CANADIAN PATENT

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SNOWMOBILE SKI AND METHOD OF MAKING A SKI RAIL

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No. OF CLAIMS 5

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This invention relates to skis and, more particularly, to a wear rail for a snowmobile ski and a method of making same.

Snowmobiles conventionally include a pair of snow-engageable skis which are steerable to control the direction in which the vehicle is being propelled. When a snowmobile with conventional skis is being turned on ice or hard snow, the snowmobile will have a large turning radius because conventional skis will merely slide along the surface of the snow without "digging in". To reduce the turning radius of a snowmobile under such conditions, wear rods, which are substantially narrower than the skis, are placed on the underside of the skis for "digging in" the snow and ice. Unless these rods are of exceptionally hard material, they wear very quickly and must be replaced. On the other hand, if the entire rod is made of hardened material, the cost of the wear rod is exorbitant. According to the present invention, wear rails are placed along the underside of the wear rod to "dig in" the snow and ice and are much harder than the wear rod to minimize wear.

It has been discovered that the cost of a hardened wear rail which extends for the entire length of the wear rod is also exorbitant. In addition, it has been found that the wear rail is easily removed if it is merely welded to the wear rod. Accordingly, it is an object of the present invention to provide a new and novel ski including a wear-resistant ski rail which will not easily be removed from the ski rod.

It is another object of the present invention to provide a ski having a ski rod on the underside thereof and a wear-resistant ski rail received in a slot cut in the ski rod and extending for only a portion of the length of the ski rod.

It is another object of the present invention to provide a snowmobile ski having a wear-resistant ski rail which is so positioned as to facilitate turning of the snowmobile.

Other objects and advantages of the present invention



will become apparent to those of ordinary skill in the art as the description thereof proceeds.

A method of making a ski rail for use on the underside of an elongated, steerable ski runner which is adapted to be mounted on a snowmobile for turning movement about a vertical steering axis interjacent the ends of the ski runner comprising the steps of cutting an elongated, downwardly opening, open-ended slot in the underside of an elongated wear rod which is adapted to be connected to the underside of said ski runner, the slot being cut in only a predetermined length of the wear rod, placing a wear rail of harder material than said wear rod in the slot in abutting relation with the rear end wall of said slot such that a greater portion of said wear rail is rearward of said axis than forward thereof; and pressing the side walls of the slot vertically toward the wear rail to secure the rail in position.

The present invention may more readily be described by reference to the accompanying drawings in which:

Figure 1 is a side perspective view illustrating the front end of a snowmobile supported on a pair of steerable skis;

Figure 2 is a side elevational view of one of the skis illustrated in Figure 1, part of the ski being broken away to more particularly illustrate the manner in which the wear rod is fastened to the ski;

Figure 3 is a bottom plan view of the ski illustrated in Figure 2;

Figure 4 is a greatly enlarged, sectional end view taken along the line 4-4 of Figure 2;

Figure 5 is a greatly enlarged fragmentary perspective view illustrating the wear rod only in an inverted position during assembly; and

Figure 6 is an enlarged perspective view illustrating a wear rail inserted into an inverted rail receiving slot cut

into the wear rod during assembly.

Apparatus constructed according to the present invention is particularly adapted for use on a snowmobile, generally designated S, supported and driven by the usual endless flexible drive belt 10 and steerable by a pair of forward skis, generally designated 12.

The snowmobile S includes a pair of laterally spaced apart king pins 14 pivotally connected by pivot pins 16 to ski supporting leaf springs 18 connected to the top of the skis 12 by longitudinally spaced brackets 20. When the snowmobile operator turns the handle bars (not shown), the king pins 14 turn about their longitudinal axis a to pivot the skis 12 about their vertical steering axes 24.

Each of the skis 12 includes a longitudinal ski runner 26 having an upturned forward end 26a which minimizes the resistance to forward movement of the ski along the snow. A longitudinal recess 28 (Figure 4), extending substantially the length of the ski is provided in the underside of each ski runner 26 to receive a wear rod 30. A plurality of apertures 32 are provided in the ski runner 26 to permit bolts 34 fixed to the top of the wear rail 30 to pass therethrough. A plurality of nuts 36 are provided to secure the wear rods 30 to the underside of the skis 12.

Provided in the underside of each wear rod 30 is an elongated, dovetailed, downwardly opening slot 38 snugly receiving a hardened wear strip 40 of triangular cross-section and fabricated from wear-resistant material, such as tungsten carbide, or the like. The length of the notch 38 in the underside of the wear rod 30 is substantially less than the length of the wear rod 30. A pair of end slots 42 and 44 are provided in the front and rear ends of the underside of the wear rod 30 to receive relatively short, hardened wear strips 46 and 49 respectively.

The apparatus illustrated in Figures 1 - 4 is manufactured by firstly milling the slot 38a (Figure 5) in the underside of the wear rod 30 which is substantially less than the length of the wear rod 30. A predetermined greater portion R of the slot 38a is rearward of the turning axis 24 than the portion F which is forward thereof. The wear strip 40, having a triangular cross section and being of a length $F + R$ equal to the length of the slot 38a, is inserted into the slot 38a when the wear rod 30 is in the position illustrated in Figure 5.

The side walls 38b of the slot 38 are then cold rolled downwardly toward the wear rail 40 into snug engagement with the sides 40a of the rail 40 to tightly hold the wear rail 40 to provide the dovetail slot 38 illustrated in Figure 4. The side walls 38b may be pressed into engagement with the sides 40a of the rail 40 by a suitable die (not shown) which fits over and receives the wear rail 40. To prevent the wear rail from moving longitudinally, the length of the wear rail 40 is substantially equal to the length $F + R$ of the slot 38 such that the ends 40b of the wear rod 40 are in abutting engagement with the front and rear end walls 38c of the slot 38. If desired, a pair of slots may be cut in opposite ends of the wear rail to receive relatively short wear rail strips 46 and 48 to enhance the steering capabilities. It is important that a greater portion R of the wear rail 40 be rearward of the axis 24 than forward thereof to improve the steering capabilities of the vehicle. Because the wear rail is snugly received in the rear of the slot, the rearward movement thereof is prevented.

It should be understood that the ski could be manufactured by milling the slot 38a in the entire length of the wear rod 30, inserting the short wear strip 48 at the rear of the ski, inserting a spacer bar (not shown) in abutting engagement with the wear strip 48, inserting the wear rail 40 in abutting

engagement with the forward end of the spacer bar which would then constitute the rear wall of the slot, inserting an additional spacer bar in abutting engagement with the wear rail 40, inserting the front wear strip 46 in abutting engagement with the additional spacer bar, and then peening or swaging over the sides 38b of the slot 38. The spacer bars could suitably have a truncated cone vertical cross section and be disposed so that the wear rail 40 will extend below the spacer bars when mounted on the snowmobiles so that the wear rails will bear the weight of the snowmobile.

It is to be understood that the drawings and descriptive matter are in all cases to be interpreted as merely illustrative of the principles of the invention, rather than as limiting the same in any way, since it is contemplated that various changes may be made in various elements to achieve like results without departing from the spirit of the invention or the scope of the appended claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A method of making a ski, for use on a snowmobile, having an elongated, steerable ski runner adapted for turning movement about a vertical steering axis interjacent the ends of said ski comprising the steps of: forming an elongated, open ended slot defined by at least upstanding side walls and a rear wall in an elongated wear rod, said slot being formed in only a predetermined length of said wear rod; placing a wear rail, of harder material than said wear rod, in the slot in abutting relation with said rear wall such that a greater portion of said wear rail is rearward of said axis than forward thereof; pressing the side walls of the slot vertically and inwardly toward the wear rail to clamp the rail in position; and mounting the wear rod on the underside of said elongated ski runner so that the wear rail is disposed on the underside thereof to bear the weight of the snowmobile.
2. The method set forth in claim 1 wherein the slot forming step is accomplished by cutting a greater predetermined portion of said slot rearwardly of said axis than forward thereof to provide a front wall for said slot which is closer to said axis than said rear wall; said placing step being accomplished by placing said wear rail in said slot such that the ends of said wear rail are in abutting relation with the forward and rear end walls of said slot.
3. The method of claim 1 wherein said pressing step is accomplished by cold rolling the side walls of the slot tightly against said wear rail.
4. The method set forth in claim 1 wherein the forming step is accomplished by cutting a groove in the underside of said wear rod, inserting at least one spacer bar in said groove to define the rear wall of said slot.
5. A ground-engageable ski adapted to be mounted on a

snowmobile for turning movement about a generally vertical steering axis interjacent the ends of said ski, to steer the snowmobile, comprising: an elongated ski runner, having an up-turned forward end, adapted to be connected to said snowmobile; an elongate wear rod mounted on the underside of said runner and having a slot in the underside thereof, and being of a length substantially lesser than the length of said rod, a predetermined greater portion of said slot being rearward of said axis than forward thereof; a wear rail being disposed in said slot in abutting relation with opposite end walls thereof; and a portion of said wear rod being formed over the underside of said rail to secure it in said slot.

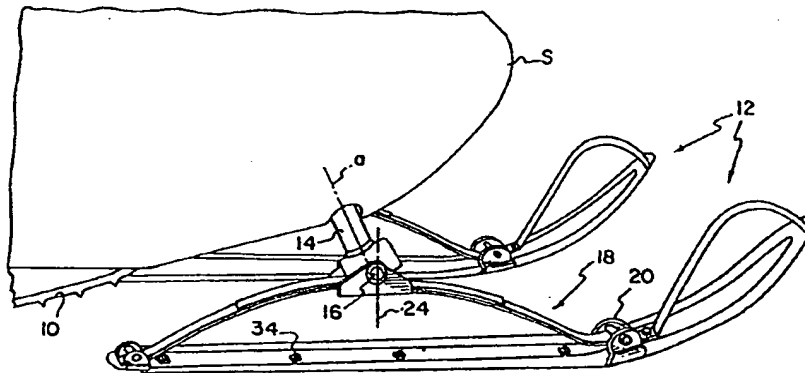


FIG. 1

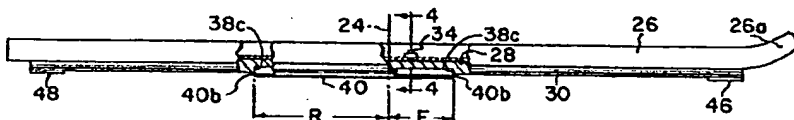


FIG. 2

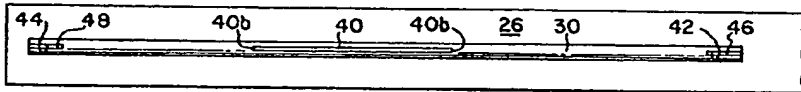


FIG. 3

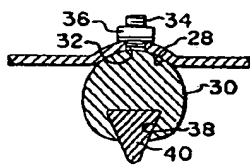


FIG. 4

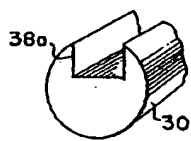


FIG. 5

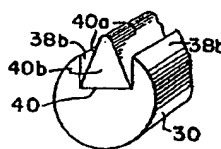


FIG. 6

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